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DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Albuquerque Area Indian Health Service
5300 Homestead **Rd,** NE
Albuquerque. New Mexico **871**10

April 23, 2007

Dale C. Alverson, M.D., Director
Center for Telehealth
University *of* New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This serves as the Albuquerque Area Indian Health Service letter of commitment to partner with the University of New Mexico in the proposed FCC Rural Healthcare Pilot program.

IHS Albuquerque Area:
Regional Internet 2 Access for **IHS** Wide Area Network

I. Contact Information

A. Fiscal Point-of-Contact
Rhonda Boal
Chief Financial Officer
Division of Financial Management
Albuquerque Area Office
5300 Homestead Rd. NE
Aibuquerque, New Mexico 87110
(505) *248-4582*
e-mail: Rhonda.Boal@ihs.gov

Proaram Point-of-Contact
Joseph F. Lucero
Director
Division of Information Management Service
Albuquerque Area Office
5300 Homestead Rd. NE
Albuquerque, New Mexico 87110
e-mail: Joseph.Lucero@ihs.gov

II. Scope of Work

A. Goals and objectives.

The goal for Albuquerque Area Office is to access to Internet2 along with the Indian Health Service Navajo, Phoenix, and Tucson Areas. This means upgrading our current routers in order to assure that a secure and reliable device can support the various types of protocols required for communication into Internet2.

This project will result in the following outcomes:

- Provide an avenue to expand our Tele-health services in a secure and efficient manner to our Business Partners. In addition other "Doors" will be able to be opened to allow for our remote locations to access health, technical and administrative support services,

B. Previous experience in developing and managing telemedicine programs.

Current ABQ Area IHS sites transmitting images:

- Albuquerque Indian Health Center
- ACL Hospital (Transmitting X-ray images
- Jemez Health Center (all images sent to PACS)
- Dulce Health Center (all images sent to PACS)
- Zuni Indian Hospital (all images sent to PACS)
- Mescalero Indian Hospital* (X-ray images transmits)

Albuquerque Area currently utilizes and supports 7 (seven) Tele-video Systems for supporting Tele-Behavioral Health Consults.

C. Project oversight.

Albuquerque Area will also support its own regional telemedicine network and activities via the existing administrative and clinical infrastructure/leadership of those Areas.

D. Indicate to what extent your network can be self-sustaining once established.

Sustaining Internet2 access once established will be supported by IHS Technical staff up to the "edge" of the Indian Health Service Network.

The total requested budget for proposed year 1 $169,830 and include the following:

Hardware		
Fiber Connection Between AIH and UNM		21,250
AIH Router		
Cisco 3845	$	14,000.00
DS3 module	$	5,000.00
Fiber Module (need **2** modules)	$	10,000.00
AIH Router Total		24,650
AAO Router		
Cisco 3845	$	14,000.00
DS3 Module *to* AIH	$	5,000.00
DS3 Module to Verizon	$	5,000.00
WICs to T1 Need 14 WICS (14x700)	$	9,800.00
AAO Router Total	$	28,730.00
3 Service Units (Need 8 Cisco 3845's)		8 x $14000 = $95,200

For these items Albuquerque Area Indian Health Service has also committed to $29,970 in matching funds for proposed year 1. Albuquerque Area Indian Health Service will supply the University of New Mexico with appropriate documentation for backup of the matching funds as they are spent.

I certify that the statements herein are true, complete and accurate to the best of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties.

Thank you,

Rhonda Boal
Chief Financial Officer
Division of Financial Management
Albuquerque Area Office
5300 Homestead Rd. NE
Albuquerque, New Mexico 87110
(505) 248-4582
E-mail: Rhonda.Boal@ihs.gov

DEPARTMENT OF HEALTH & **HUMAN** SERVICES — Public Heaith Service

Navajo Area
indian Health Service
P.O. Box 9020
Window Rock, Arizona 86515-9020

Aprii 16, 2007

Dale C. Alverson, M.D., Director
Center for Teieheaith
University *of* New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This serves as the Navajo Area Indian Health Service letter of commitment to partner with the University *of* New Mexico in the proposed FCC Rural Healthcare Pilot program.

The Navajo Area IHS (NAIHS) Program's goals with respect to the FCC Rural Healthcare Pilot program are to upgrade its existing wide area network infrastructure to enable increased security and redundancy of telemedicine communications and to implement modern quality of service technologies that are critical to teiemedicine communications. **By** implementing modern telecommunications carrier class network backbone technologies, NAIHS will be well positioned to interoperate with regional network partners via national high-speed backbone networks such as Internet2 or NLR.

The NAIHS Program's objectives with respect to the FCC Rural Healthcare Pilot program are:

- Create a high speed platform with Internet2 as the backbone for Telemedicine:
  - X-Ray Reads - The NAIHS has patients that are routine (back pain, etc...) and emergencies (Trauma, Blood Clots, Hemorrhage in liver or spleen, etc...).
    - CT Scan
    - Ultra Sounds
    - Chest
    - Spine
    - Abdomen
    - Armand Leg
    - Mammograms
    - Etc...
  - X-Ray Consults - The NAIHS has patients who are in need of emergent neurosurgical consultations.
    - Head Trauma
- Reduce Contract Health Service (CHS) costs to minimize potential relocation of patients outside the NAIHS service area.
- Enable increased security and redundancy of telemedicine communications
  - Create a Mesh WAN topology capable of disaster recovery and resilience.
  - Install Carrier class Router at NAO w/ Security Bundle feature.
  - Install ISR Routers at Service Units, Health Centers, and Health Stations.
  - Install IAN switching fabric at Service Units, Health Centers, and Health Stations.
  - Install Active Directory Domain Controllers

The Navajo Area IHS (NAIHS) has experience with developing and managing teiemedicine program partnerships and collaborations with:

- The Arizona Teiemedicine Program (ATP)
- The Regents of the University of New Mexico, for its public operation known as the Health Sciences Center, specifically for the School of Medicine, Department of Neurosurgery and University Hospital ("UNMHSC")'

These partnerships and collaborations involve the following iegai document arrangements and agreements:

- Memorandum of Understanding (MOU) agreements.
- FISMA Clearance
- Interconnection Service Agreement (ISA)
- Section 508 Compliance
- Business Partner Agreement (BPA)

These partnerships and coiiaborations have involved the following WAN / LAN infrastructure considerations and infrastructure build outs:

- Dedicated Telemedicine WAN circuits accommodating the payload transmission of NAIHS X-Ray DIACOM image files for Reads and Consults.
- Dedicated Teiemedicine Routers.

VLAN of LAN traffic at Service Units, Health Centers, and Health Stations.

Leadership Structure:

The Navajo Area IHS is under IHS which is under the parent organization Department of Health and Human Services (DHHS). The leadership component can be traced to the CIO of IHS Dr. Theresa Cullen and the Southwest Health Consortium (Phoenix, Albuquerque, Tucson, and Navajo Area Offices). These leadership vessels meet routinely throughout the Fiscal year.

- Charles Havekost as CIO of DHHS
- Dr. Theresa Cullen as CIO of IHS
- LCDR Michael J. Belgarde as CIO of Navajo Area HIS (NAIHS)

Management Structure:

The project management will be project management wiil be largely the responsibility of LCDR Michael J. Belgarde with the **brain trust** of:

- IHS Office of Information Technology **(ON)**
- IHS Network Operations Security Center (NOSC)
- Arizona Telemedicine Program (ATP)
- Federal Contractor Awardees

Work Pian and Schedule:

The Navajo Area IHS (NAIHS) work plan if awarded involves:

- Year 1
  - Comply with Federal Acquisition Requirements (FAR)
  - Author a Performance Based Scope of Work (PBSOW) for Mesh WAN topology Hardware (HW)
  - Compete the PBSOW for a Contractor
  - Coordinate with partnerships, collaborations and the brain trust
  - Order leased circuits
  - Enroll leased circuits with the Universal Service Administration Company (USAC)

The total requested budget for proposed year 1 ($1,605,000) and potential year *2* ($625,000) for a total amount of $2,230,000 and include upgrade cored and edge routing and iirewall equipment first year, second year, additional core network upgrades and network edge device upgrades, seeking to cover costs of backbone and spoke private line services that are not eligible under previous USF Aural Healthcare funding restrictions that limited eligibility to rural areas. For these items Navajo Area Indian Health Service has also committed to ($240,000) in matching funds For proposed year 1 and potential year *2* in the amount of ($170,000) for a total of $410,000. Navajo Area Indian Health Service will supply the University of New Mexico with appropriate documentation for backup of the matching funds as they are spent.

I certify that the statements herein are true, complete and accurate to the besr of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result *of* this application. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, *or* administrative penalties.

Thank you,

John Hubbard, Jr., Area Director
Navajo Area Indian Health Service

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Indian Health Service
Tucson Area Office
Office of the Director
7900 South "J" Stock Road
Tucson, AZ 85746-9352

April 16, 2007

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This serves as the Tucson Area Indian Health Service letter of commitment to partner with the University of New Mexico in the proposed FCC Rural Healthcare Pilot program. The project goal is to develop and implement a high availability Tucson regional Telehealth network within two years that will achieve the following outcomes:

- Connection of 95% of the Tucson Area providers, who will be able to actively share electronic health information with Tucson Area IHS facilities;
- Improved access to health care resources, quality of care and quality transparency by providing timely health information to providers and beneficiaries;
- Improved coordination of care for chronic diseases and increase preventive interventions;
- Improved coordination between behavioral health and physical health services which will reduce medication errors/abuse and increase case management effectiveness;
- Reduction in medical costs associated with prescription errors, diagnostic lab/radiology test redundancy, unnecessary emergency room utilization and medical errors;
- Implement open source tools to meet technical standards common to web technologies and internet connectivity.

The TAIHS CIO's previous experience in developing and managing telemedicine programs include: served as the CIO of the Navajo Area IHS and Director of Information Resource Management at the Phoenix Area IHS, worked collaboratively with hospital and health care center staffs in developing Telehealth network infrastructure in support of connectivity to the Arizona Telemedicine Network. Provided technical and administrative support for infrastructure development for telemedicine clinical services, distance learning, videoconferencing and modalities to include; radiology, dermatology, retinal screening, cardiology, and mental health. Provide technical and administrative oversight of current telehealth infrastructure and future FCC Rural Health Care Pilot Program for the Tucson Area IHS. Previous experience in working with the USDA's Universal Service Administration in support of the Navajo, Phoenix, and Tucson Areas infrastructure expansion and development. Tucson area network will be 100% self-sustaining. I2 connectivity along with local circuit access will continue to be funded and supported beyond the two-year pilot period. Along with the existing Universal Service funded circuits, the Pilot Program establishes funding support for Internet2 access that would otherwise be extremely costly IHS Areas and facilities. The Tucson Area IHS will monitor the project and access improvement for enhanced access to health care resources to IHS and Tribal facilities.

The total requested budget for proposed year 1 ($192,000) and potential year 2 ($130,000) is in the amount of $322,000 and include upgrade routing and WAN network equipment in first year, additional network upgrades second year, fiber and expanded bandwidth connectivity to San Simon and San Xavier facilities, San Simon, $48,000 for fiber and connectivity in first year, $32,000 for connectivity second year, San Xavier, $94,000 for fiber and connectivity in first year, $48,000 for connectivity in second year. For these items Tucson Area Indian Health Service has also committed to ($28,800) in matching funds for proposed year 1 and ($19,500 for potential year 2 for a total of $48,300. Tucson Area Indian Health Service will supply the University of New Mexico with appropriate documentation for backup of the matching funds as they are spent.

I certify that the statements herein are true, complete and accurate to the best of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties.

Thank you,

George W. Bearpaw
Area Director, TAIHS

Fiscal Agent contact information

Marilyn Lomakema
Senior Contracting Officer
7900 South J. Stock Road
Tucson, AZ 85746

UNM

Information Technology Services
Computing Services

April 16, 2007

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This letter serves as the Information Technology Services (ITS) letter of commitment to participate in the FCC Rural Healthcare Pilot Program Proposal. The Scope of Work is:

1) To provide access into the rural areas of New Mexico to the national high-speed communication
backbones of Internet2 and National Lambda Rail for TeleHealth services.
2) To provide efficiency, better management capabilities and lower connection costs by using existing aggregation points (GigaPops) of Networks.
3) To provide a secure and reliable statewide network of networks that intercoimects to the national networks.

The total requested budget for proposed year 1 is ($3,650,000) and for potential year 2 is ($1,600,000) bringing the total amount to $5,250,000, which includes Computer Software, Equipment and Materials and Services. For these items ITS has also committed to $933,333.34 in matching funds for proposed year 1 and potential year 2 the amount of ($933,333.34) for a total of $1,866,666.66. Accordingly, ITS will supply the University of New Mexico with appropriate documentation for backup of the matching funds as they are spent.

I certify that the statements herein are true, complete and accurate to the best of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, or fraudulent statements or claiins may subject me to criminal, civil, or administrative penalties.

Sincerely,

Moira Gerety, Director
Information Technology Services (ITS)

April 23, 2007

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This serves as the New Mexico Institute of Mining and Technology (NM Tech) letter of commitment to partner with the University of New Mexico in the proposed FCC Rural Healthcare Pilot program. Scope of work relative to the budget is as follows:

Access:
Provide access into the rural areas of New Mexico to the national high-speed communication backbones of Internet2 (12) and National LambdaRail (NLR) for TeleHealth services.

Efficiency:
Provide efficient, professionally managed core network facilities that maximize network performance and lower connection costs by using existing aggregation points of Networks (e.g. GigaPops).

eiiability:
Provide a secure and reliable statewide network of networks that interconnects to the national and international resources.

Scalability:
Provide a network infrastructure that maximizes the number of connected areas and institutions in the southwest United States.

The University of New Mexico (UNM), New Mexico Institute of Mining and Technology (NMIMT) and New Mexico State University (NMSU) oversee the operation of expansive and reliable campus, statewide and national networks that interconnect higher education, public education, government and national laboratories to commodity and research networks. These include a state fiber network, the Internet (I1), I2 and NLR. The network includes rural higher education campuses, agricultural experiment stations, tribal networks, research parks and the Albuquerque and Las Cruces metro areas. Many TeleHealth services use these networks.

Existing statewide networking partnerships include CHECSNet, NMLR (New Mexico Lambda Rail), Sandoval Broadband. GSD (General Services Division of NM State Government), ITTH (Internet to the Hogan) and the Rio Grande Optical Network. These networks are interconnected at aggregation points, or "GigaPops", in the southern, central northern regions of New Mexico. Each POP managed and maintained by professional network engineers 24/7. The depth and breadth of this operational responsibility has built up knowledge and expertise to support any proposed networking initiatives. The facilities also utilize extensive electronic networking monitoring, including load balancing and intrusion detection, to oversee this "network of networks". A minimal investment would be required to monitor the new rural TeleHealth sites.

April 23, 2007

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This serves as the New Mexico State University (NMSU) letter of commitment to partner with the University of New Mexico in the proposed FCC Rural Healthcare Pilot program. Scope of work relative to the budget is as follows:

Access:
Provide access into the rural areas of New Mexico to the national high-speed communication backbones of Internet2 (12) and National LambdaRail (NLR) for TeleHealth services.

Efficiency:
Provide efficient, professionally managed core network faciiities that maximize network performance and lower connection costs by using existing aggregation points of Networks (e.g. GigaPops).

Reliability:
Provide a secure and reliable statewide network of networks that interconnects to the national and international resources.

Scalability:
Provide a network infrastructure that maximizes the number *of* connected areas and institutions in the southwest United States.

The University of New Mexico (UNM), New Mexico Institute of Mining and Technology (NMIMT) and New Mexico State University (NMSU) oversee the operation of expansive and reliable campus, statewide and national networks that interconnect higher education, public education, government and national laboratories to commodity and research networks. These include a state fiber network, the Internet (I1), I2 and NLR. The network includes rural higher education campuses, agricultural experiment stations, tribal networks, research parks and the Albuquerque and Las Cruces metro areas. Many TeleHealth services use these networks.

Existing statewide networking partnerships include CHECSNet, NMLR (New Mexico Lambda Rail), Sandovai Broadband, GSD (General Services Division of NM State Government), ITTH (Internet to the Hogan) and the Rio Grande Optical Network. These networks are interconnected at aggregation points, or "GigaPops", in the southern, central northern regions of New Mexico. Each POP managed and maintained by professional network engineers 24/7. The depth and breadth of this operational responsibility has built up knowledge and expertise to support any proposed networking initiatives. The facilities also utilize extensive electronic networking monitoring, including load balancing and intrusion detection, to oversee this "network of networks". A minimal investment would be required to monitor the new rural TeleHealth sites.

The Universities and the State of New Mexico General Services Department (GSD) will continue their existing partnership to provide project management and collaborative leadership to achieve the goals and objectives *of* the proposal. Our partnership has formal memoranda *of* understanding (MOU), and we work together to discuss, plan and implement statewide projects. Work plans are developed by members of the State and Universities, and are approved by a steering committee of the State and the Universities as well as the New Mexico LambdaRail not-for-profit corporation. The work plan will be to connect rural areas to the nearest GigaPop enabling statewide as well as national network connections. Areas will be prioritized based on cost, network capability available, and relevance to the goals of the project.

Our current, low speed network is already self-sustaining. We intend to purchase dark fiber and equipment with one-time, capital funding to eliminate the monthly fees for some of the existing circuits. The savings will be used to offset the increases in maintenance and long haul (e.g. I2) costs. All of the network backbone and a majority of the connected sites wiil use this approach. A draft business plan has been developed to recover costs of connectivity. This business plan will be completed and implemented based on available capital funding for the network expansion. The new network would only lease circuits where dark fiber was not available. This lower cost approach enables us to continue the self-sustaining model. Ultimately, the ongoing costs of the network are borne by customers using the new services. Our experience has shown that rural areas will readily pay for service that they would not normally obtain.

Scope *of* work relative to budget:

The total requested budget for proposed year 1 ($1,000,000) and potential year 2 ($1,000,000) for a total amount of $2,000,000 and include upgrades to existing equipment, new optical routers, switches, cabling; enhance current Monitoring software, (Monitoring Centers at NMSU and UNM), first year enable backbone to remote sites, 2nd year more sites, installation, site travel and testing. For these items NMSU has also committed to ($233,333.33) in matching funds for proposed year 1 and potential year *2* in the amount of ($233,333.33) for a total of $466,666.66. NMSU will supply the University of New Mexico with appropriate documentation for backup of the matching funds as they are spent.

I certify that the statements herein are true, complete and accurate to the best of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties.

Thank you,

Michael Hites
Vice President for Planning and Information Technology
CIO New Mexico State University

The University of New Mexico
Department of Electrical and Computer Engineering MSC01 1100 1 University of New Mexico Albuquerque, NM 87131-0001
USA Phone: (505) 277-2630 Fax: (505) 277-1439 w\w.ece.uim.edu

April 27, 2007

Dale C. Alverson, M.D., Director Center for Telehealth University of New Mexico Health Sciences Center MSC11 6090 Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This letter serves as the Electrical & Computer Engineering letter of commitment to participate in the FCC Rural Healthcare Pilot Program Proposal.

The Electrical and Computer Engineering (ECE) is conducting research to enable seamless communication between mobile (and stationary) devices across multiple networks and through heterogeneous communication environments. Our approach, which is funded by NSF under the FIND initiative, is based on a transient mobile network in which all communications occur between persistently identified entities. Such a network, which is mobile and ubiquitous in nature, allows entities to form and associate themselves with coordinated ad-hoc networks that are provided the means to integrate almost seamlessly with each other. ECE's approach leads to simplified network operations, management and provisioning, by placing all aspects of network administration into a common information management framework. This allows the overall architecture to maintain addressing and communications inter-connectivity while extensive implementation-level disruptions are carried out at the lower levels of the implementation and to adapt naturally, the incorporation of existing and future communication technologies. The total requested budget for proposed year 1 is $581,435 and potential year 2 is $0.

Initial Network Design Studies and Modeling

One of the goals of this proposal is to develop general approach for analysis and design of secure, reliable networks with a given functionality applicable to local as well as national size networks for disaster relief This goal is very hard to achieve without detailed analysis of different network architectures as well as modeling and simulations of appropriate real life scenarios. In this section we will present our network design methodology, simulation strategies of three large-scale disasters, and data analysis of the simulations.

The Electrical and Computer Engineering Department at UNM in collaboration with the Los Alamos National Laboratory has extensive experience with large-scale simulations and in recent year this experience has been applied to national security problems. These include large-scale pandemics, analysis of the National energy grid, terrorist networks, etc. In these examples a large number of units are interconnected in a network, which evolves in time. Agent-based models have been indispensable for understanding the dynamics of these networks and in this proposal we will extensively use this methodology. Agent-based models are mathematical abstractions of distributed systems consisting of many units forming an interconnected web. Each unit's physical properties are mapped onto the mathematical quantities characterizing the agent. For example in the case of a computer network the agent can be the facility at a given location and the properties of this facility like the time of operation, number of people at the facility, type and number of medical equipment, type and number of computers, etc are mapped into mathematical quantities. The connections between different facilities and the connection throughputs are mapped on the network properties (links) formed by the agents. A typical simulation involves an initial state of the system and a given scenario. Then the system is evolved based on an algorithm involving both deterministic and stochastic components. At predetermined intervals of time the

result of the operation of network are analyzed. The C++ programming language is particularly well designed for such applications. In C++ the agents form a class of objects and the operations on the agents are the methods defined in this class. C++ is also fast compiled language that allows large number of agents to be efficiently simulated. Using C++ will allow us to simulate networks of the size of the United States as well as networks spanning the Earth.

In this proposal we will focus on three "real life" scenarios of great importance for our Nation. 1. Pandemic occurring in the US; 2. Large forest fire spreading in several neighboring states, and 3. Severe earthquake. Each of these three scenarios has different disaster relief requirements and will load the network in a different way allowing us better to probe our design. A major issue in computational studies like this is the validation of the model and the results. We plan to perform small-scale experiments to validate our approach.

Our data analysis will be based on irreducible frequent pattern analysis (IFPA), which has been used to analyze transaction data-bases. The exchange of information between network nodes can be viewed as information transactions at a given time. Each information exchange forms a bimodal transaction: sending of the information by the first node and acceptance of the information by the receiving node or nodes. Each of these can be quantified by numbers between 0 and 1, with 0 corresponding to complete failure and 1 to a complete success. Frequent patterns are transfer patterns that occur often in the operation of the network and the irreducible frequent patters correspond to patterns that cannot be decomposed into a sum of other simpler patterns.

Network architectures: internet, brain networks, immunological networks, human population networks, national energy grid. Stability and security analysis based on different metrics;
Data dynamics on networks: traffic on different networks, stability, redundancy, security versus overload.
Simulation and iterations
An example of a real emergency situation(s) in New Mexico. In these simulations different initial situations will be simulated and the network performance will be evaluated. In the simulations we will take into account external factors that can influence the network: human, electrical, weather etc.

Determination of Optimal TAG and plan the most appropriate implementation. Based on the network analysis methodology developed in IV. a. develop cost functions and set large-scale optimization simulations to find the optimal architecture. Here we will employ simulated annealing, genetic algorithms, conjugate gradient methods to find optimal solutions to the network architecture subject to the geographical and other existing constraints.

I certify that the statements herein are true, complete and accurate to the best of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties.

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Sincerely,

Los Alamos
NATIONAL LABORATORY
EST 1943

TheoreficalDivision

Mail Stop B210
Los Alamos, New Mexico 87545
505-667-4401/Fax 505-665-4055

Date: 26 April 2007
Refer To: T-DO

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson.

This serves as the Los Alamos National Laboratory letter of commitment to collaborate with the University of New Mexico in the proposed FCC Rural Healthcare Pilot program.

One of the goals of this proposal is to develop a general approach for analysis and design of secure, reliable networks with a given functionality applicable to local as well as national size networks for disaster relief. This goal is very hard to achieve without detailed analysis of different network architectures as well as modeling and simulation of appropriate real life scenarios. Los Alamos National Laboratory has extensive experience with large-scale simulations and in recent years this experience has been applied to national security problems. We are prepared to use this expertise to advise and collaborate with Dr. Krastan Blagoev in agent-based simulations of the networks considered in this proposal. Our experience includes large-scale pandemics, analysis of the National energy grid, terrorist networks, etc. In these examples a large number of units are interconnected in a network, which evolves in time. Agent-based models have been indispensable for understanding the dynamics of these networks and this proposal will extensively use this methodology.

We plan to collaborate with Dr. Blagoev when he undertakes simulations that consider examples of real emergency situations. In these simulations different initial situations will be simulated and the network performance can be evaluated with some of the techniques we have developed at Los Alamos.

I look forward to a rewarding collaboration in this very interesting project.

Sincerely,

Antonio Redondo, Ph.D.
Division Leader (Acting)
Theoretical Division

Vice President for Research
onsored Projects **Services**
J. **Box** *3308*
888 **N.** Euclid. Room 510
Tucson, AZ 85722-3308

THE UNIVERSITY OF
ARIZONA.
TUCSON ARIZONA

(520) 626-6000
FAX: (520) *626-1137*

April 16, 2007

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This serves as the Arizona Telemedicine Program's letter of commitment to partner with the University of New Mexico in the proposed FCC Rural Healthcare Pilot program. The Arizona Telemedicine Program's goals with respect to the FCC Rural Healthcare Pilot program are to upgrade its existing wide area network infrastructure to enable increased security of telemedicine communications and to implement modern quality of service technologies that are critical to telemedicine communications. By implementing modern telecommunications carrier class network backbone technologies, ATP will be well positioned to interoperate with regional network partners via national high-speed backbone networks such as Internet2 or NLR. ATP plans to use its existing connectivity to Internet2 through the University of Arizona to link with regional or national peers to enable telemedicine services and research. As part of the Southwest Telehealth Access Grid (TAG), ATP plans to collaborate, via Internet2/NLR and potentially other networks, with other TAG participants in the modeling, testing and deployment of network communications architectures and services that are tailored for optimal use of telemedicine communications during times of disaster or emergency.

The total requested budget for proposed year 1 ($449,699) and potential year 2 ($429,167) is in the amount of $878,866 which includes plans to upgrade cored and edge routing and firewall equipment first year. Second year, additional core network upgrades and network edge device upgrades. Seeking to cover costs of backbone and spoke private line services that are not eligible under previous USF Rural Healthcare funding restrictions that limited eligibility to rural areas. For these items ATP has committed to first year ($147,217) and second year ($144,138) for a total of $291,355 in matching funds for proposed year 1 and potential year 2. ATP will supply The University of New Mexico documentation for backup of the matching funds as they are spent.

I certify that the statements herein are true, complete and accurate to the best of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties.

Thank You,

Lee Anne Peters
Contract Officer

April 16, 2007

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 *6090*
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This letter serves as Holy Cross Hospital's letter of commitment to partner with The University of New Mexico in the proposed FCC Rural Healthcare Pilot program.

Holy Cross Hospital's goals with respect to the FCC Rural Healthcare Pilot program are to upgrade its existing network infrastructure to implement modern quality of service technologies that are critical to telemedicine communications and to enable increased security of telemedicine communications. By implementing modern telecommunications carrier class network backbone technologies, HCH will be well positioned to interoperate with regional network partners via national high-speed backbone networks

HCH objectives in participating in the grant proposal are to:

- Connect all HCH clinical sites to a backbone network with sufficient bandwidth to support telehealth, emergency response, educational and certification programs.
- Link HCH' network to external providers and networks such as the New Mexico Telehealth Alliance, New Mexico Health Information Collaborative, Collaborative Action for Taos County Health, Taos County Indigent Fund, First Born Program, Enchanted Health Outreach for Kids, University of New Mexico and Emergency Response teams.
- Upgrade bandwidth and network throughput; purchase bridges, routers, switches, servers; purchase encryption software; implement network monitoring and intrusion detection; implement highly secure network access points and protocols to ensure compliance with all relevant best practices, HIPAA and other applicable regulations.

The total requested budget for proposed year 1($85,000) and potential year 2 ($20,000) is in the amount of $105,000 and includes hardware, software, connectivity, network design and network deployment costs. For these items HCH has also committed to matching funds in year one of $(12,750) and year two of ($3,000) for a total of $15,750 in matching funds. HCH will supply The University of New Mexico with appropriate documentation for backup of the matching funds as they are spent.

I certify that the statements herein are true, complete and accurate to the best of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties.

Thank you,

Kelley Shull Tredwin
Development Officer
Holy Cross Hospital
P.O. Box DD
Taos, NM 87571
kshull@taoshosDital.org
505-751-5711

PMS

PRESBYTERIAN MEDICAL SERVICES

Building a Healthier State

April 16, 2007

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This letter serves as the Presbyterian Medical Services letter of commitment to partner with The University of New Mexico in the proposed FCC Rural Healthcare Pilot Project.

PMS Scope *of* Work:

A. Objectives

PMS' objectives in participating in the grant proposal are to:

- connect all PMS clinical and Head Start sites to a backbone network with sufficient bandwidth to support Telehealth, Emergency Response, Educational and Certification programs.
- Link PMS' network to external providers and networks such as the New Mexico Telehealth Alliance, Project Echo, Project Reach, and Emergency Response teams.
- Upgrade bandwidth and network throughput; purchase bridges, routers, switches, servers; purchase encryption software; implement network monitoring and intrusion detection; implement highly secure network access points and protocols to ensure compliance with all relevant best practices, HIPAA and other applicable regulations.

C. High-Level Project Management and Work Plan

Since the grant is heavily focused on technical infrastructure, PMS' overall project will be managed by the Information Services (IS) Department, headed by their Chief Information Officer (CIO), Noemi deBodisco.

Business and Clinical oversight will be provided by:

- Dr. Larry Lyons, MD, Vice President of Clinical Affairs,
- Dr. Ted Testa, PsyD., Director of Behavioral Health,
- Erica Stubbs, Director of Children's Services

Compliance oversight will be provided by:

- Don Daniel, Vice President of Legal Affairs & General Counsel
- Samantha Hults, Corporate Compliance Officer

PMS System Directors and Site Administrators will be involved at the detailed implementation phases of the project.

1422 Paseo de Peralta, Bldg. 3 ■ **PO.***Box 2267* ■ Santa Fe, NM 67504 ■ (505) 982-5565 ■ (505) 986-8299
www.pms-healthierstate.org

High-Level Work Plan

Our approach will be to align with our partners without hampering PMS-specific task progress. Clearly, many tasks can be achieved by individual entities working in parallel with other grant partners, but coordination will be critical. We will operate with the understanding that there will be an overarching Executive Committee comprised of all Grant Partners to be responsible for the administration of the overall grant, which will provide oversight, high level prioritization, conflict resolution and status reporting.

Upon being awarded the grant, PMS will:

- Align our overall objectives, project scope and activities with our partners in the Grant;
- Establish a PMS executive project team, including the individuals above;
- Conduct detailed site surveys, and develop a plan to connect our sites in order of priority, taking into account synergies and lead times;
- Participate in network modeling activities with other grant partners;
- Participate in the development of standards for interoperability between networks, including monitoring and security;
- Assist in the development, and issuance of an RFP, as required, for network and equipment;
- Identify key points of network connectivity with our grant partners;
- Develop a detailed project plan, including specific expenditures, personnel assignment, and key milestones;
- Track and report progress both internally and to the Executive Committee.

Estimated Schedule

- Overall estimate is approximately 11 months from the time the grant is awarded.
- Month 1:
  - Establish Governance
  - Develop overall project plan, meeting schedules, communications plan
  - Develop individual entity work plans
  - Identify requirements for competitive bidding
  - Prioritize sites and interconnection points
  - Develop acceptance criteria and criteria for success
- Month 2:
  - Site Surveys
  - Equipment readiness
  - Competitive Bids for equipment, network services
  - Purchase equipment upgrades
  - Establish protocols for network interconnection
- Month 3:
  - Complete bidding process
  - Contracts
  - Develop vendor rollout schedules
  - Site work

- Month 4-10
  - PMS estimates that the overall project of upgrading our network sites and connecting all the locations will take approximately six months from the time competitive bidding is complete.
  - Test network interconnections
  - Progress reports, course correction
- Month 11
  - Review and assess
  - Report Progress
  - Plan for second year

The requested budget is for proposed year 1 ($1,131,400) and potential year 2 ($ 673,600) for a total of $1,805,000. PMS has also committed to ($202,500) in matching funds for proposed year 1 and ($158,900) for potential year 2 for a total of $361,400 in matching funds for proposed year 1 and potential year 2. PMS will supply the University of New Mexico with appropriate documentation for backup of the matching funds as they are spent.

I certify that the statements herein are true, complete and accurate to the best of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, *or* fraudulent statements or claims may subject me to criminal, civil, or administrative penalties.

Thank you,

James L. Riebsomer
President and CEO
Presbyterian Medical Services
1422 Paseo de Peralta
P.O Box 2267
Santa Fe, New Mexico, 87504

Sangre de Cristo
Community Health Partnership
100% Access - Salud Para Todos

April 16, 2007

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This letter serves as Sangre de Cristo Community Health Partnership letter of commitment to partner with The University of New Mexico in the proposed FCC Rural Healthcare Pilot Project.

I. Contact Information
   a. Sangre de Cristo Community Health Partnership, a 501(c) (3) non-profit.
   Arturo Gonzales, PhD, Executive Director
   Austin Buff, Information Resources Manager
   1441 S. St. Francis Dr. suite A
   Santa Fe, New Mexico 87505
   (505) 983-8011

II. Scope of Work
   a. Goals and Objectives -. The goals of Sangre de Cristo Community Health Partnership (SDCCHP) in participation with this program are to increase access to and quality of delivery of substance abuse and mental health screening, brief intervention, treatment and referral services in rural areas of the state *of* New Mexico. In addition to having developed and implemented well-established network of behavioral health providers integrated within 35 health care facilities across the state to further this goal, .SDCCHP has currently implemented and maintains ***20*** **Telehealth** sites statewide to support this initiative.

   b. SDCCHP's objectives with FCC funding **support** is to ***be*** able to continue maintaining the current Teleheaith infrastructure and wherever feasible expand best clinical practice services to additional areas of the state by expanding SDCCHP's existing telemedicine infrastructure, Specifically the current Telehealth infrastructure and any future expansions will ***be*** used to

      - Eventually create a statewide system for substance abuse and mental health prevention, intervention and treatment.
      - Provide clinical supervision of the SBIRT Behavioral Health Counselors;
      - Conduct psychiatric patient clinical staffing and consultations

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- Provide continuing professional clinical. education to Behavioral Health Counselors, and partner site clinical providers and staff.

c. **Previous Experience** – SDCCHP currently manages and maintains two existing Telehealth networks. (1) One for use in the Substance Abuse and Mental Health Service Administration's Center for Substance Abuse Treatment (SAMHSA CSAT).Screening, Brief Intervention, Referral and Treatment (SBIRT) project; and (2) Implementation of the New Mexico Department *of* Health's Office of School and Adolescent Health (OSAH) for development, training and maintenance of 18 school based health centers across New Mexico.
The SAMHSA CSAT SBIRT network consists of 20 sites each equipped with videoconferencing capability over an IP network involving T-1 lines into each facility.

The OSAH network is in its initial phase of implementation of 18 sites and also involves T-1 lines into each facility. Further phases are expected, based on state funding considerations. SDCCHP has been overseeing and maintaining the SAMHSA CSAT SBIRT network for two years and has been developing the OSAH network for the past year. (Please see attached maps for a list *of* sites,)

Project Management Plan – SDCCHP current has employed the professional staff and industry contacts in place to be able to continue management of the current Telehealth initiatives as well as any proposed

The total requested budget for proposed year 1 ($221,850) and potential year 2 ($228,660) is in the amount of $486.663 and include connectivity fees for Pecos, and additional site to be TBA and 20 already existing SDCCHP Telehealth sites, routers, managed fast Ethernet switches, and single point *of* maintenance contact for all 22 teleheaith sites. For these items Sangre de Cristo Community Health Partnership has also committed to ($36,153) in matching funds for proposed year 1 and no matching funds for potential year 2. Sangre *de* Cristo Community Health Partnership will supply the University of New Mexico with appropriate documentation for backup of the matching funds as they are spent.

I certify that the statements herein are true, complete and accurate *to* the best of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties.

Thank you,

Arturo N. Gonzales, Ph.D.
Executive Director

Paul Nelson
Chief Financial Officer

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TAG Future Site List

Site Name	City	State	Address	ZIP	Phone #
ALBUQUERQUE HEALTH CARE FOR THE HOMELESS	Albuquerque	NM	1217 1st Street NW	87102	505-243-3373
BENARCHERHEALTHCARECENTER	Alamogordo	NM	1501 East 10th Street	88310	505-443-8133
BENARCHERHEALTHCARECENTER	Columbus	NM	626 Taft Street	88029	505-531-2165
BENARCHERHEALTHCARECENTER	Hatch	NM	255 Highway 187	87937	505-267-3088
BENARCHERHEALTHCARECENTER	Las Cruces	NM	1600 Thorpe	88005	505-382-9292
BENARCHERHEALTHCARECENTER	Truth or Consequences	NM	1960 North Date	87901	505-894-7662
DE BACA FAMILY PRACTICE CLINIC	Fort Sumner	NM	500 North 10th Street	88119	505-355-2414
EL PUEBLO HEALTH SERVICES, INC.	Bernalillo	NM	121 Calle del Presidente	87004	505-867-2324
FIRST CHOICE COMMUNITY HEALTH CARE	Albuquerque	NM	111 Coors Road NW, Suite E-2	87121	505-833-0024
FIRST CHOICE COMMUNITY HEALTH CARE	Albuquerque	NM	1231 Candelaria NW	87107	505-345-3244
FIRST CHOICE COMMUNITY HEALTH CARE	Albuquerque	NM	1316 Broadway, SE	87102	505-768-5450
FIRST CHOICE COMMUNITY HEALTH CARE	Albuquerque	NM	2001 North Centro Familiar SW	87105	505-873-7400
FIRST CHOICE COMMUNITY HEALTH CARE	Albuquerque	NM	2127 Los Padillas Road SW	87105	505-452-8633
FIRST CHOICE COMMUNITY HEALTH CARE	Albuquerque	NM	2300 Arenal Rd SW	87105	505-873-0220
FIRST CHOICE COMMUNITY HEALTH CARE	Albuquerque	NM	6900 Gonzales SW	87121	505-831-2534
FIRST CHOICE COMMUNITY HEALTH CARE	Albuquerque	NM	7704 2nd Street NW	87107	505-890-1458
FIRST CHOICE COMMUNITY HEALTH CARE	Belen	NM	120 South 9th Street	87002	505-861-1013
FIRST CHOICE COMMUNITY HEALTH CARE	Edgewood	NM	8 Medical Center Road	87015	505-281-3406
FIRST CHOICE COMMUNITY HEALTH CARE	Los Lunas	NM	1258 Highway 314	87031	505-865-4618
FIRST NATIONS COMMUNITY HEALTHSOURCE	Albuquerque	NM	5608 Zuni SE	87108	505-262-2481
FIRST NATIONS COMMUNITY HEALTHSOURCE	Albuquerque	NM	5608 Zuni SE	87108	505-262-6541
HEALTH CENTERS OF NORTHERN NEW MEXICO	Anton Chico	NM		87711	505-427-5036
HEALTH CENTERS OF NORTHERN NEW MEXICO	Chama	NM	211 North Pine	87250	505-756-2143
HEALTH CENTERS OF NORTHERN NEW MEXICO	Coyote	NM	Highway 96, East End of Town	87012	505-638-5487
HEALTH CENTERS OF NORTHERN NEW MEXICO	Embudo	NM	State Road 68, No. 2243	87531	505-579-4255
HEALTH CENTERS OF NORTHERN NEW MEXICO	Espanola	NM	111 North Railroad Avenue	87532	505-753-7218
HEALTH CENTERS OF NORTHERN NEW MEXICO	Espanola	NM	620 Coronado Street	87532	505-753-7395
HEALTH CENTERS OF NORTHERN NEW MEXICO	Espanola	NM	711 Bond Street	87532	505-753-9503
HEALTH CENTERS OF NORTHERN NEW MEXICO	Las Vegas	NM	1928 Hot Springs Blvd	87701	505-425-6788
HEALTH CENTERS OF NORTHERN NEW MEXICO	Las Vegas	NM	Mora & Baca 9th Street	87701	505-454-3219
HEALTH CENTERS OF NORTHERN NEW MEXICO	NM	NM	Wagon Mound	87752	505-666-2288
HEALTH CENTERS OF NORTHERN NEW MEXICO	Penasco	NM	15136 Highway 75	87553	505-587-2809
HEALTH CENTERS OF NORTHERN NEW MEXICO	Ribera	NM	San Miguel Clinic	87560	505-421-1113